

# *Status of Unsafe Dams in Arizona*

There are currently 21 dams in Arizona classified as being in an unsafe<sup>1</sup> condition. Upon review of the listings, these dams can best be placed in four categories:

## Category 1: Unsafe Dams with Elevated Risk of Failure

These dams have confirmed safety deficiencies for which there is concern they could fail during a 100-year or smaller flood event. There is an urgent need to repair or remove these dams.

### DECEMBER 2007 PRIORITY RANKINGS<sup>2</sup>

<i>Priority</i>	<i>Dam Name</i>	<i>Owner</i>	<i>County</i>	<i>Legis.</i>	<i>Congr.</i>	<i>Current Status</i>	<i>Estimated Const. Cost</i>	<i>Likely Funding Source(s)</i>	<i>Opportunity for Dam Repair Fund<sup>3</sup></i>
1	<i>Fredonia</i>	<i>Town of Fredonia</i>	<i>Coconino</i>	3	1	<i>Rehabilitation Planning</i>	<i>\$5M - \$10M</i>	<i>(1) Federal Rehab. Grant – 65/35 cost-share. (2) Federal budget appropriation.</i>	<i>Rehabilitation Design in absence of 2009 Federal Funding - \$250K (est.)</i>
2	<i>Powerline</i>	<i>Maricopa County / ASLD</i>	<i>Pinal</i>	22	6	<i>Engineering Investigations</i>	<i>Unknown</i>	<i>(1) County/State (2) Federal Rehab. Grant – 65/35 cost-share.</i>	
3	<i>Magma</i>	<i>Magma Flood Control District</i>	<i>Pinal</i>	23	1 & 6	<i>Rehabilitation Design</i>	<i>\$5M - \$7M</i>	<i>(1) District Bonding (2) Cost-share agreement among downstream developers.</i>	
4	<i>Cook</i>	<i>Eastern Arizona College</i>	<i>Graham</i>	5	1	<i>Removal Design</i>	<i>\$100K - \$200K</i>	<i>Dam Repair Fund</i>	<i>2008 Design and Removal - \$200K (est.)</i>

## Category 2: Unsafe Dams Requiring Rehabilitation or Removal

These dams have confirmed safety deficiencies and require either repair or removal. These dams are prioritized for repair or removal behind the Category 1 dams.

### DECEMBER 2007 PRIORITY RANKINGS<sup>2</sup>

<i>Priority</i>	<i>Dam Name</i>	<i>Owner</i>	<i>County</i>	<i>Legis.</i>	<i>Congr.</i>	<i>Current Status</i>	<i>Estimated Const. Cost</i>	<i>Likely Funding Source(s)</i>	<i>Opportunity for Dam Repair Fund<sup>3</sup></i>
5	Odell	Pinewood Country Club	Coconino	1	1	Engineering Investigations (ADWR)	Unknown	Dam Repair Fund	Design and Removal - \$250K (est.)
6	Black Canyon	AzG&F	Navajo	5	1	Rehabilitation Design	\$1M - \$2M	AzG&F	
7	Amerind #8	Amerind Foundation	Cochise	25	8	Funding Negotiations	Unknown	(1) Owner (2) ADOT (3) Dam Repair Fund	Design and Removal - \$100K (est.)
8	Colter	Lyman Water Company	Apache	5	1	Storage Restriction	Unknown	(1) County/State (2) Dam Repair Fund	Rehabilitation Design - \$250K (est.)
9	Buckeye No. 1	Maricopa County	Maricopa	4	2	Rehabilitation Planning	\$20M	(1) County (2) Federal Rehab. Grant – 65/35 cost-share.	
10	Millet Swale	Silver Creek Flood Protection District	Navajo	5	1	Rehabilitation Design	\$1M	(1) County/State (2) Dam Repair Fund	
11	Lone Pine	Navajo County	Navajo	5	1	Bridge Replacement Project	N / A		
12	PVNGS Pond #1	AZ Public Service	Maricopa	25	7	Storage Restriction	Unknown	Owner	

### **Category 3: Unsafe Dams with Uncertain Stability during Extreme Events (Requiring Study)**

These non-earth dams have been reclassified to high hazard potential due to downstream development (i.e. “hazard creep”). They lack necessary documentation demonstrating that they meet or exceed standard stability criteria for high hazard dams during extreme overtopping and seismic events. They are classified as unsafe pending the results of required studies. Upon completion of these studies, they are either removed from the list of unsafe dams or moved to Category 2 and prioritized for repair or removal.

#### **DECEMBER 2007 LISTINGS**

<b><i>Dam Name</i></b>	<b><i>Owner</i></b>	<b><i>County</i></b>	<b><i>Legis.</i></b>	<b><i>Congr.</i></b>	<b><i>Current Status</i></b>	<b><i>Likely Funding Source(s) for Required Studies</i></b>	<b><i>Opportunity for Dam Repair Fund<sup>3</sup></i></b>
<i>Frye Mesa</i>	<i>City of Safford</i>	<i>Graham</i>	<i>5</i>	<i>1</i>	<i>Reclassified High Hazard in October 2004. No action to date.</i>	<i>(1) Owner (2) Dam Repair Fund</i>	<i>Study - \$75K (est.)</i>
<i>Walnut Canyon</i>	<i>Private Owner</i>	<i>Coconino</i>	<i>1</i>	<i>1</i>	<i>Reclassified High Hazard in March 2007. Owner has agreed to perform required studies.</i>	<i>(1) Owner (2) Dam Repair Fund</i>	<i>Study - \$75K (est.)</i>

### **Category 4: Unsafe Dams Pending Evaluation of Flood-Passing Capacity (Requiring Study)**

*Background: In 1979 the U.S. Army Corps of Engineers established Federal Guidelines for assessing the safe-flood passing capacity of high hazard potential dams (CFR Vol. 44 No. 188). These guidelines established one-half of the “probable maximum flood” (PMF) as the minimum storm which must be safely passed without overtopping and subsequent failure of the dam. Dams unable to safely pass a storm of this size were classified as being in an “unsafe, non-emergency” condition.*

Prior studies for these earthen dams (mostly performed in the 1980’s) predicted they could not safely pass one-half of the PMF. They were predicted to overtop and fail for flood events ranging from 30 to 47 percent of the PMF. Recent studies both statewide and nationwide have indicated that the science of PMF hydrology as practiced in the 1980’s commonly overestimates the PMF for a given watershed. These dams should be re-evaluated using updated methods to confirm their safety status. Upon completion of these evaluations, they are either removed from the list of unsafe dams or moved to Category 2 and prioritized for repair or removal.

DECEMBER 2007 LISTINGS

<b>Dam Name</b>	<b>Owner</b>	<b>County</b>	<b>Legis.</b>	<b>Congr.</b>	<b>Current Status</b>	<b>Likely Funding Source(s) for Required Studies</b>	<b>Opportunity for Dam Repair Fund<sup>3</sup></b>
<i>Graveyard Wash</i>	<i>City of Safford</i>	<i>Graham</i>	<i>5</i>	<i>1</i>	<i>Site-Specific PMF study near completion</i>	<i>Federal Rehab. Grant – 65/35 cost-share.</i>	
<i>Frye Creek</i>	<i>Town of Thatcher</i>	<i>Graham</i>	<i>5</i>	<i>1</i>	<i>Site-Specific PMF study near completion</i>	<i>Federal Rehab. Grant – 65/35 cost-share.</i>	
<i>Stockton Wash</i>	<i>Graham County</i>	<i>Graham</i>	<i>5</i>	<i>1</i>	<i>Site-Specific PMF study near completion</i>	<i>Federal Rehab. Grant – 65/35 cost-share.</i>	
<i>Central Detention</i>	<i>Private Owner</i>	<i>Graham</i>	<i>5</i>	<i>1</i>	<i>Pending information from on-going nearby studies</i>	<i>Dam Repair Fund</i>	
<i>Florence</i>	<i>Florence Area Flood Control District</i>	<i>Pinal</i>	<i>23</i>	<i>1</i>	<i>Pending information from on-going nearby studies at Magma Dam</i>	<i>Federal Rehab. Grant – 65/35 cost-share.</i>	
<i>Jaques</i>	<i>City of Show Low</i>	<i>Navajo</i>	<i>5</i>	<i>1</i>	<i>No action to date</i>	<i>(1) Owner (2) Dam Repair Fund (3) Potential joint study with AzG&amp;F</i>	<i>Study - \$50K (est.)</i>
<i>Fool Hollow</i>	<i>AzG&amp;F</i>	<i>Navajo</i>	<i>5</i>	<i>1</i>	<i>Rehabilitation Planning</i>	<i>(1) Owner (2) Dam Repair Fund (3) Potential joint study with City of Show Low</i>	<i>Study - \$50K (est.)</i>

Notes

<sup>1</sup> “Unsafe” means that safety deficiencies in a dam or spillway could result in failure of the dam with subsequent loss of human life or significant property damage. A.A.C. R12-15-1202(46.).

<sup>2</sup> Priority rankings are scored using Numerical Rankings for Jurisdictional Dams in Arizona, developed by Tetra Tech, Inc. 2001.

<sup>3</sup> Dam Repair Fund (approx. \$940K) is not adequate for currently identified funding opportunities.